



US Army Corps  
of Engineers®



IWR  
INSTITUTE FOR  
WATER RESOURCES

## *Barge and Towboat Operating Costs*

Marianne Matheny-Katz  
IWR

Sept 2002

1



US Army Corps  
of Engineers®



IWR  
INSTITUTE FOR  
WATER RESOURCES


*Federal Interagency Vessel and Shipping  
Costs Workshop - Washington DC  
September 24, 2002  
Barge & Towboat Operating Costs*

### **Background**

- Corps of Engineers Headquarters has issued shallow draft operating cost guidance 12 times since 1979. The most recent update was issued in April 2002
- The most recent Guidance is EGM-00-5 and is available at the Corps of Engineers Website:  
[http://www.usace.army.mil/inet/functions/cw/cecwp/cecwp\\_temp/egm051.pdf](http://www.usace.army.mil/inet/functions/cw/cecwp/cecwp_temp/egm051.pdf)


September 2002

2



US Army Corps  
of Engineers®


*Federal Interagency Vessel and Shipping  
Costs Workshop - Washington DC  
September 24, 2002  
Barge & Towboat Operating Costs*



**Purpose of Guidance**


- Guidance provides cost information for vessels operating on the Inland Waterway System, including the Mississippi river and its tributaries – Ohio, Illinois, Monongahela, Kanawha and the Gulf Intracoastal Waterway
- Vessel operating costs are used by the Corps of Engineers Districts in determining economic benefits associated with waterways improvements

September 2002 3



US Army Corps  
of Engineers®


*Federal Interagency Vessel and Shipping  
Costs Workshop - Washington DC  
September 24, 2002  
Barge & Towboat Operating Costs*



**What Information Is Presented?**


Towboats - Cost information is presented for 13 sizes of towboats, ranging from 400-600 horsepower (hp) up to 10,000 hp

September 2002 4



US Army Corps  
of Engineers®


*Federal Interagency Vessel and Shipping  
Costs Workshop - Washington DC  
September 24, 2002  
Barge & Towboat Operating Costs*



## What Information Is Presented?


- Barges - Cost Information is presented for 27 different types of barges across 8 classes of barges. These include: open hopper, covers hopper, deck, self-loading, tank, pressurized tank, steel tank, and chemical tank

September 2002 5



US Army Corps  
of Engineers®


*Federal Interagency Vessel and Shipping  
Costs Workshop - Washington DC  
September 24, 2002  
Barge & Towboat Operating Costs*



## Who Uses the Cost Information?


- Primary Customer - Corps District Offices
- Other Federal Agencies - Dept. of Transportation, Tennessee Valley Authority
- Reebie Associates - uses the cost information as an input to their Barge Costing Model
- Private Sector Firms, consulting firms

September 2002 6



US Army Corps  
of Engineers®


*Federal Interagency Vessel and Shipping  
Costs Workshop - Washington DC  
September 24, 2002  
Barge & Towboat Operating Costs*



**Recent History of Cost Updates**


- Last two iterations were prepared in 1996/97 and 1999. The results were published in June 1997 and April 2000, respectively
- Cost information developed by contractors to IWR
- 1996/97 - Jack Faucett Associates
- 1999 - PMCL, Inc.

September 2002 7



US Army Corps  
of Engineers®

*Federal Interagency Vessel and Shipping  
Costs Workshop - Washington DC  
September 24, 2002  
Barge & Towboat Operating Costs*



**How are the Cost Estimates Developed?**

Step 1 - Contractor meets with towboat and barge firms


Step 2 - Contractor develops cost equations

Step 3 - Contractor submits written report to IWR

Step 4 - IWR reviews report, sends report out to field for review


Step 5 - After all comments are reviewed and incorporated, IWR sends Guidance to Headquarters for final distribution to the field.

September 2002 8



US Army Corps  
of Engineers®


*Federal Interagency Vessel and Shipping  
Costs Workshop - Washington DC  
September 24, 2002  
Barge & Towboat Operating Costs*



**What Information is provided in the  
economic Guidance**


- Barges
  - Replacement Costs
  - Operating Costs
  - Administrative costs
  - Port costs

September 2002 9



US Army Corps  
of Engineers®


*Federal Interagency Vessel and Shipping  
Costs Workshop - Washington DC  
September 24, 2002  
Barge & Towboat Operating Costs*



**What Information is provided in the  
economic Guidance**


- Towboats
  - Replacement Costs
  - Total Operating Costs
  - Crew Related Costs (such as wages, fringe benefits, food, transportation)

September 2002 10



US Army Corps  
of Engineers®


*Federal Interagency Vessel and Shipping  
Costs Workshop - Washington DC  
September 24, 2002  
Barge & Towboat Operating Costs*



IWR  
INSTITUTE FOR  
WATER RESOURCES


- Towboats
  - Boat Related costs (such as maintenance and repair, supplies, insurance, other)
  - Administrative costs
  - Fuel consumption and fuel costs

September 2002 11



US Army Corps  
of Engineers®

*Federal Interagency Vessel and Shipping  
Costs Workshop - Washington DC  
September 24, 2002  
Barge & Towboat Operating Costs*




IWR  
INSTITUTE FOR  
WATER RESOURCES

## Development of Cost Equations

- Towboats
  - Total Operating costs: formula for calculating total towboat operating costs incorporates horsepower of the vessel


***Operating costs = 85.17918 \* Horsepower ^ 0.434078***

September 2002 12



**US Army Corps  
of Engineers®**

*Federal Interagency Vessel and Shipping  
Costs Workshop - Washington DC  
September 24, 2002  
Barge & Towboat Operating Costs*




## Development of Cost Equations

- **Towboats**
  - Total Operating costs are comprised of crew costs and boat related costs

***Crew Costs = 59.55987 \* Horsepower ^ 0.43332***  
***Boat costs = Total Operating Costs (-) Crew costs***


September 2002

13



**US Army Corps  
of Engineers®**

*Federal Interagency Vessel and Shipping  
Costs Workshop - Washington DC  
September 24, 2002  
Barge & Towboat Operating Costs*




## Development of Cost Equations

- **Towboats**
  - Replacement cost - formula for calculating replacement cost incorporates horsepower of vessel


***Replacement costs = 115,160.513 + 1,203.75615 \*  
Horsepower \* Horsepower ^ 0.434078***  
***Replacement cost converted to daily cost over 20 year  
horizon at the current Federal discount rate (6 1/8%) and  
350 operating days***

September 2002

14



*Federal Interagency Vessel and Shipping  
Costs Workshop - Washington DC  
September 24, 2002  
Barge & Towboat Operating Costs*




## Barge Replacement Costs


- Replacement costs are based on formulas developed during the 1997 update of corps guidance which incorporate the amount/cost of labor hours and the amount/cost of steel required to construct a vessel
- For some vessels I.e.self unloading cement barges, asphalt and ammonia barges - the replacement costs reflect the information received during the data collection phase of the update

September 2002

15



*Federal Interagency Vessel and Shipping  
Costs Workshop - Washington DC  
September 24, 2002  
Barge & Towboat Operating Costs*



## Fuel Consumption and Fuel Data

Fuel consumption equations are based on the size of the vessel

- For vessels less than or equal to 6,000 horsepower : **Fuel consumption = 0.43666 \* Horsepower ^ 1.01279**
- For vessels greater than 6,000 hp : **Fuel consumption = 0.1489 \* Horsepower ^ 1.31139**

September 2002

16





US Army Corps  
of Engineers®

*Federal Interagency Vessel and Shipping  
Costs Workshop - Washington DC  
September 24, 2002  
Barge & Towboat Operating Costs*



**Barge Operating Costs**

- Maintenance and Repair
- Supplies
- Insurance
- Other

**Administrative costs**

**Port Costs**

September 2002 17



US Army Corps  
of Engineers®


*Federal Interagency Vessel and Shipping  
Costs Workshop - Washington DC  
September 24, 2002  
Barge & Towboat Operating Costs*




**Items Not Included in the Barge and  
Towboat (Shallow Draft) Vessel  
Operating Costs Economic Guidance**

- Information on Ocean Going Barges
- Information on operating costs for vessels that  
operate in other area, such as the **Great Lakes  
and the Columbia River**

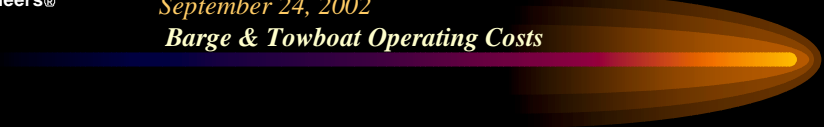
September 2002 18



US Army Corps  
of Engineers®



*Federal Interagency Vessel and Shipping  
Costs Workshop - Washington DC  
September 24, 2002  
Barge & Towboat Operating Costs*



- Other Items for discussion
- Questions and answers

September 2002 19